

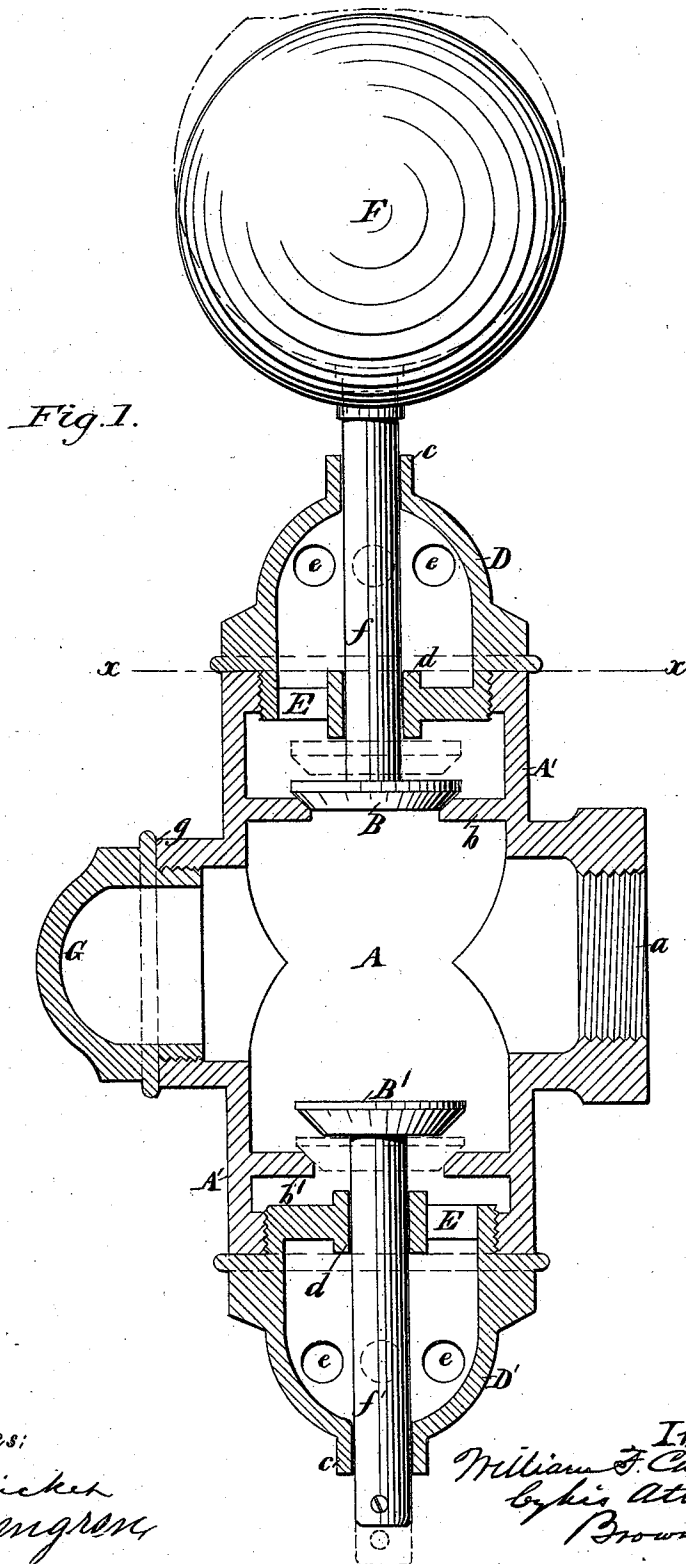
(No Model.)

2 Sheets—Sheet 1.

W. F. CUNNINGHAM.
SAFETY VALVE.

No. 402,070.

Patented Apr. 23, 1889.



Witnesses:
John Bicker
J. Bergengren

Inventor:
William F. Cunningham
by his Attorneys
Brown & Ginn

(No Model.)

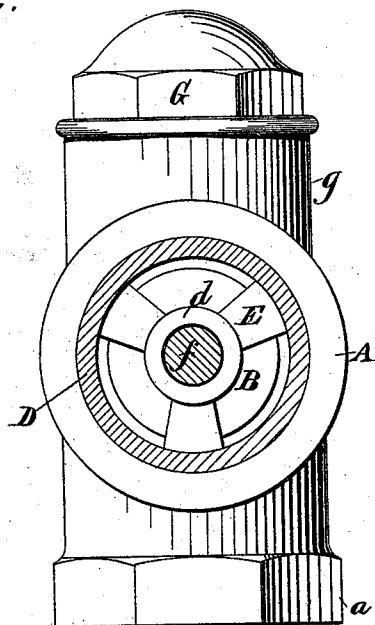
2 Sheets—Sheet 2.

W. F. CUNNINGHAM.
SAFETY VALVE.

No. 402,070.

Patented Apr. 23, 1889.

Fig. 2.



Witnesses:

John Birken
J. Bergengren

Inventor:

William F. Cunningham
by his Attorney
Brown & Growald

UNITED STATES PATENT OFFICE.

WILLIAM F. CUNNINGHAM, OF BROOKLYN, NEW YORK, ASSIGNOR OF ONE-HALF TO ENOCH RUTZLER, OF SAME PLACE.

SAFETY-VALVE.

SPECIFICATION forming part of Letters Patent No. 402,070, dated April 23, 1889.

Application filed January 23, 1889. Serial No. 297,318. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM F. CUNNINGHAM, of Brooklyn, in the county of Kings and State of New York, have invented a certain new and useful Improvement in Safety-Valves, of which the following is a specification.

My improvement embodies a safety-valve so constructed that it will be operated both upon the increase of pressure beyond what is required and also upon the decrease of pressure below normal atmospheric pressure.

I will describe in detail a safety-valve embodying my improvement, and then point out the novel features in claims.

In the accompanying drawings, Figure 1 illustrates a valve embodying my improvement, the same being shown in longitudinal section. Fig. 2 is a sectional view taken on the line *x x*, Fig. 1.

Similar letters of reference designate corresponding parts in all the figures.

A is a valve-chamber formed in a shell or case, A'. The shell or case is provided with a port, *a*, formed in a neck, which is internally screw-threaded, to enable it to be attached to a boiler or other source of pressure which it is sought to control. The outlet-port *a* is normally open.

B B' designate two valves adapted to sit upon valve-seats *b*, formed upon the interior of the case or shell A'. These valves work through suitable bearings, *c d*, formed as here shown, in cap or plug pieces D D', united by a screw-threaded connection with the case or shell A'. The bearings *c d* are formed in spiders E, and the plugs or caps D D' are hollow, so that when the valves B B' are moved from their seats there will be a free communication between the valve-chamber A and the interior of the plugs or caps D D'. The plugs or caps D D' are provided with apertures *e*, by which communication is afforded to the external atmosphere.

It will be observed that the valve-seats *b b'* are inward of the spiders E, and that the valves are so arranged that the valve B' is within the chamber A, and is adapted to be seated when the pressure coming from the port *a* is equal to or greater than normal atmospheric pressure. The valve B, on the contrary, is arranged outside the chamber A, and

is adapted to be unseated when the pressure from the port *a* increases beyond a desired point. I have shown the stem *f* of the valve B as provided outside the cap or plug D with a weight, F, which weight serves to hold the valve B to its seat until it shall be moved off from the same by an excess of pressure within the chamber A. When the valve B has been moved off from its seat, as shown more clearly in dotted lines, excess of pressure may escape through the openings *e* in the cap D.

If, now, the pressure from the port *a* should fall below normal atmospheric pressure, the pressure exerted by the atmosphere, through the openings *e* in the plug or cap D', will raise the valve B' from its seat and will thus restore the pressure in the system. The valve B' returns to its seat by gravity after the pressure has been restored, said valve being guided in its movements by means of a spindle, *f'*. The valve B therefore is operated by an excess of pressure, while the valve B' is operated upon the formation of a partial vacuum.

I have shown a plug, G, engaging a neck, *g*, upon the shell A'. By removing this plug the valve may be cleaned.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a safety-valve, the combination, with a case or shell forming a chamber and provided with a normally-open outlet-port, of two separate valves arranged at different parts of said chamber, one of which is adapted to open into said chamber and the other of which opens outwardly from said chamber, separate communications with the external atmosphere being established when either of said valves is raised from its seat, substantially as specified.

2. The combination, with a case or shell, A', having the normally-open outlet-port *a*, of the valve B', the weighted valve B, seats for said valves within the case or shell, and caps or plugs for the said shell affording separate communications with the external atmosphere when either of the valves is raised from its seat, substantially as specified.

WILLIAM F. CUNNINGHAM.

Witnesses:

HENRY T. BROWN,
FREDK. HAYNES.